http://poloclub.gatech.edu/cse6242

CSE6242 / CX4242: Data & Visual Analytics

Creating publication quality figures

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Partly based on materials by
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Example

SIGGRAPH2007 Computer Graphics Proceedings, Annual Conference Series, 2007

Scene Completion Using Millions of Photographs

James Hays Alexei A. Efros
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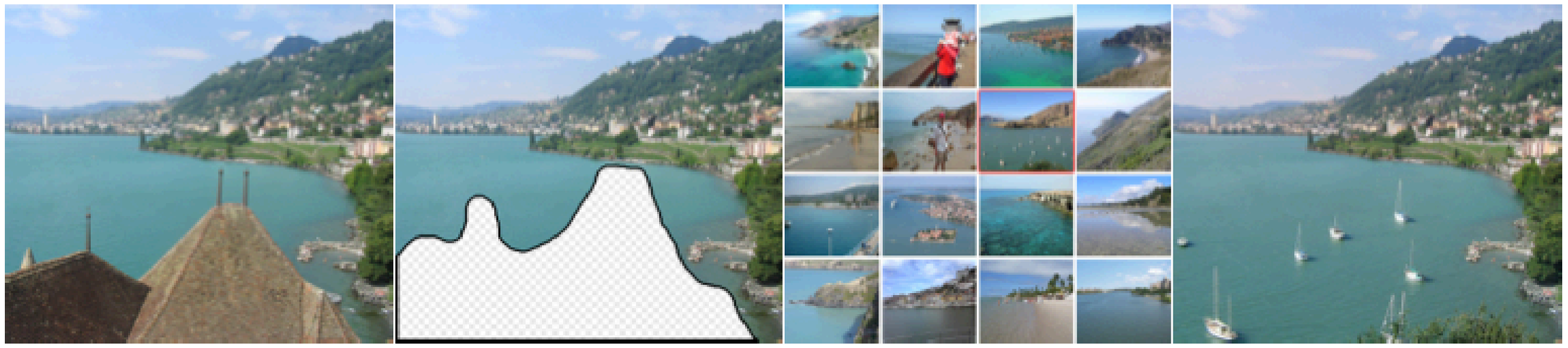


Original Image Input Scene Matches Output

Figure 1: Given an input image with a missing region, we use matching scenes from a large collection of photographs to complete the image.

Abstract

What can you do with a million images? In this paper we present a new image completion algorithm powered by a huge database of photographs gathered from the Web. The algorithm patches up holes in images by finding similar image regions in the database that are not only seamless but also semantically valid. Our chief insight is that while the space of images is effectively infinite, the space of semantically differentiable scenes is actually not that large. For many image completion tasks we are able to find similar scenes which contain image fragments that will convincingly complete the image. Our algorithm is entirely data-driven, requiring no annotations or labelling by the user. Unlike existing image completion methods, our algorithm can generate a diverse set of results for each input image and we allow users to select among them. We demon-

There are two fundamentally different strategies for image completion. The first aims to reconstruct, as accurately as possible, the data that *should have been* there, but somehow got occluded or corrupted. Methods attempting an accurate reconstruction have to use some other source of data in addition to the input image, such as video (using various background stabilization techniques, e.g. [Irani et al. 1995]) or multiple photographs of the same physical scene [Agarwala et al. 2004; Snavely et al. 2006].

The alternative is to try finding a plausible way to fill in the missing pixels, hallucinating data that *could have been* there. This is a much less easily quantifiable endeavor, relying instead on the studies of human visual perception. The most successful existing methods [Criminisi et al. 2003; Drori et al. 2003; Wexler et al. 2004; Wilczkowiak et al. 2005; Komodakis 2006] operate by extending

Example

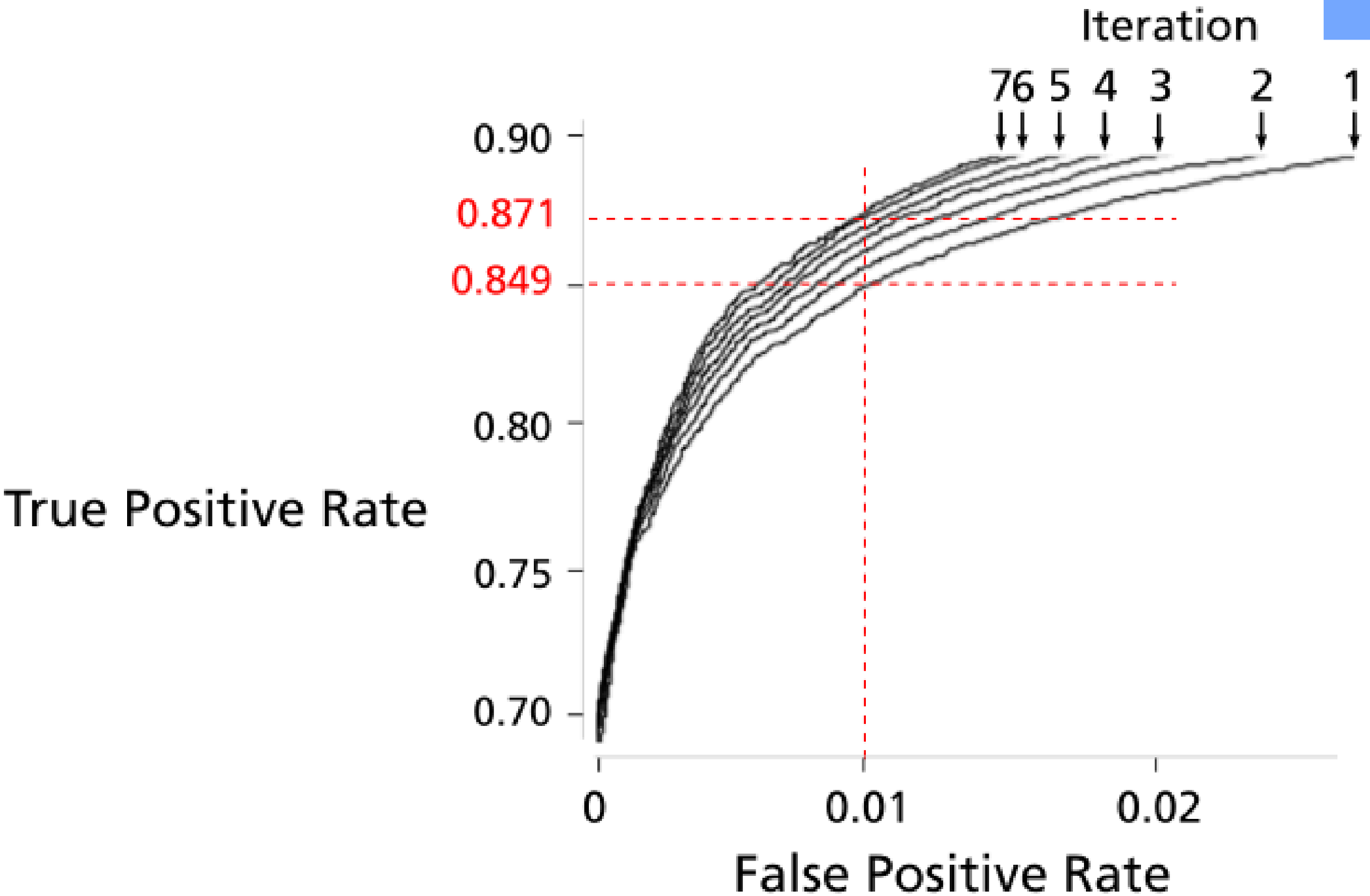
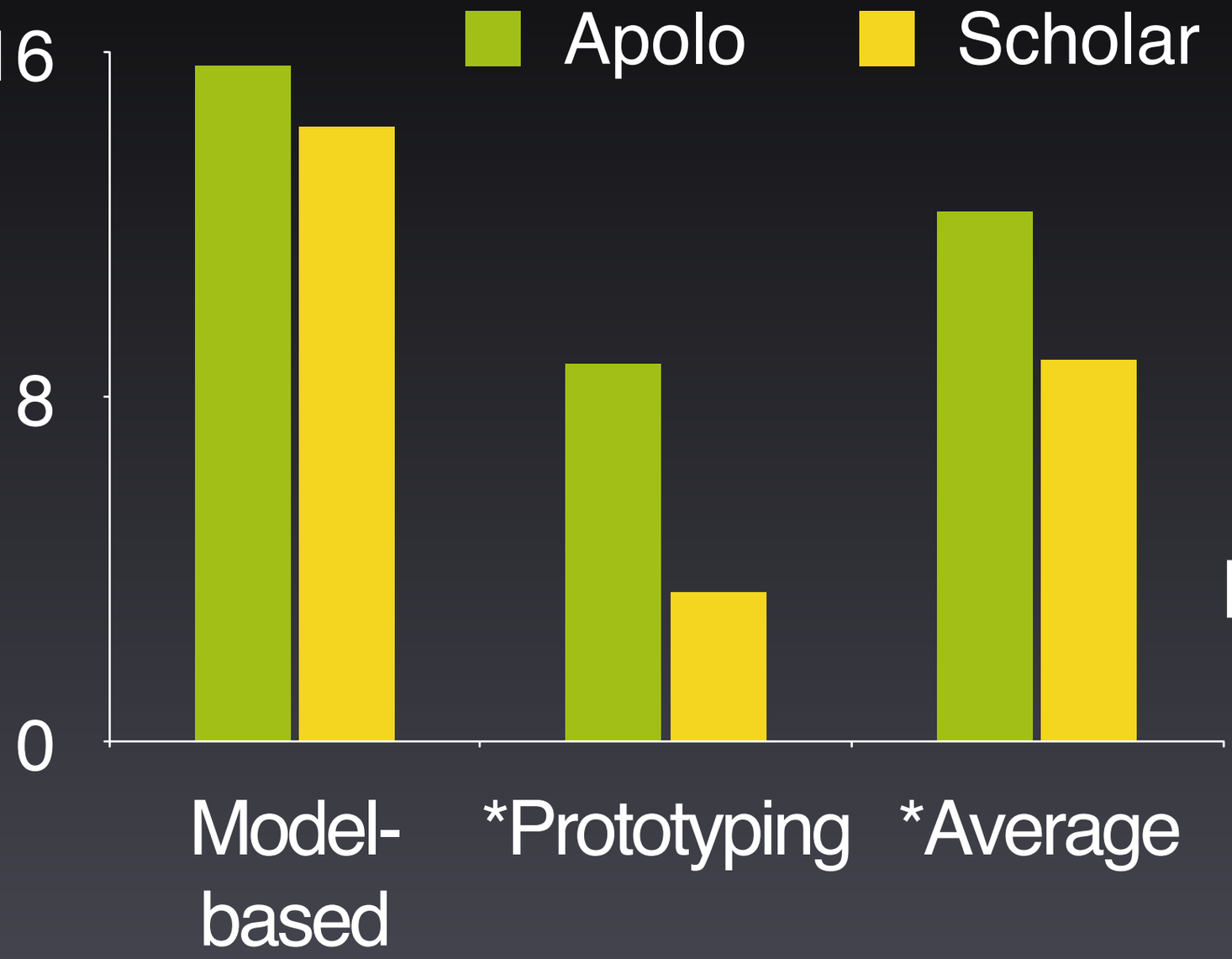


Figure 8: ROC curves of 7 iterations; true positive rate incrementally improves.

http://www.cs.cmu.edu/~dchau/polonium_sdm2011.pdf

Example

Judges' Scores



Higher is better.
Apolo wins.

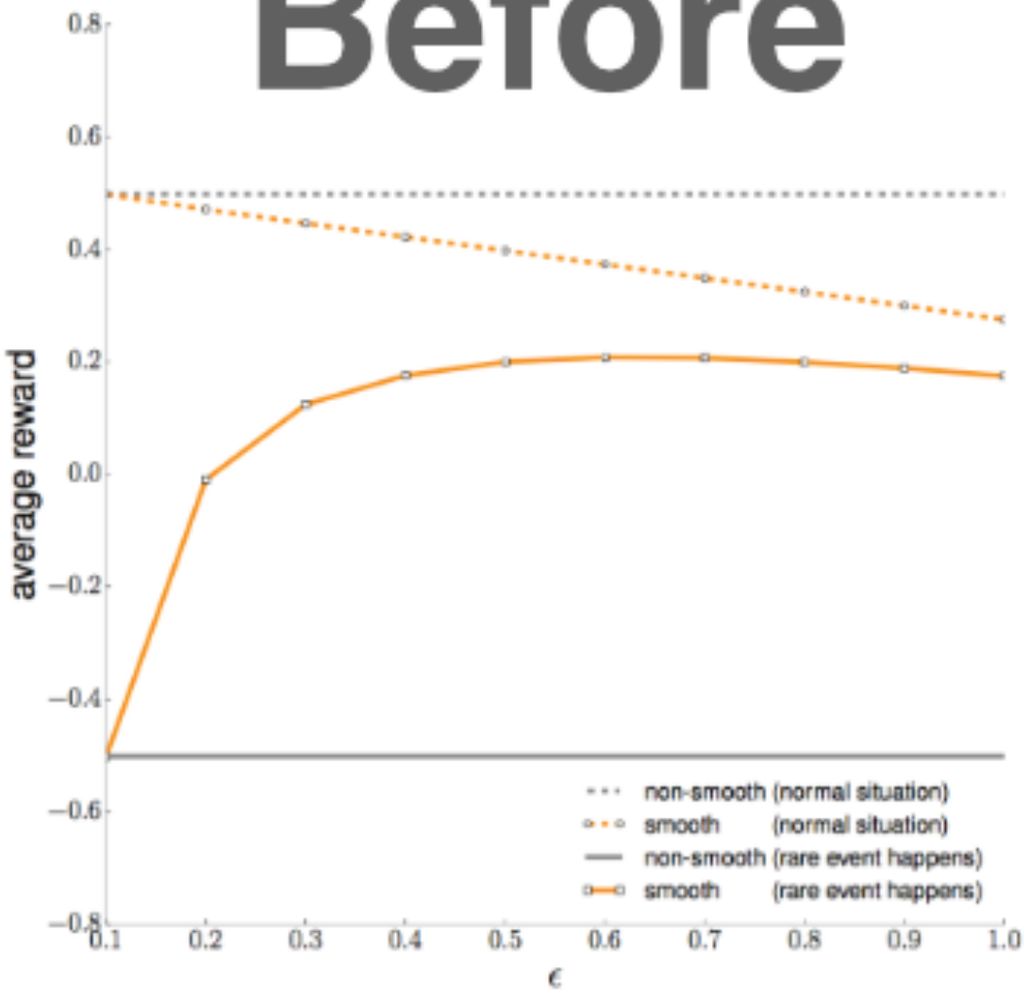
** Statistically significant, by two-tailed t test, p <0.05*

“Professional” Tools

- **Seaborn** offers good visual “defaults”
  - Use good “templates” — don’t reinvent the wheel
  - For Latex tables, use https://www.inf.ethz.ch/personal/markusp/teaching/guides/guide-tables.pdf
- Learn to use an **illustration program**
  (e.g., Inkscape, Adobe Illustrator, Affinity Designer)
  - Even just knowing the basics will go a long way — create polished figures for **presentation** and **reports**
  - Polo considers it a **life skill**

Demo: **Improving a Figure**

Before



After